RISH Ducer M 00 (LONWORKS® Interface)
Programmable multi-transducer

Data Sheet

Programmable Multi-transducer
(LONBUS Communication)

Fig. 1

Application

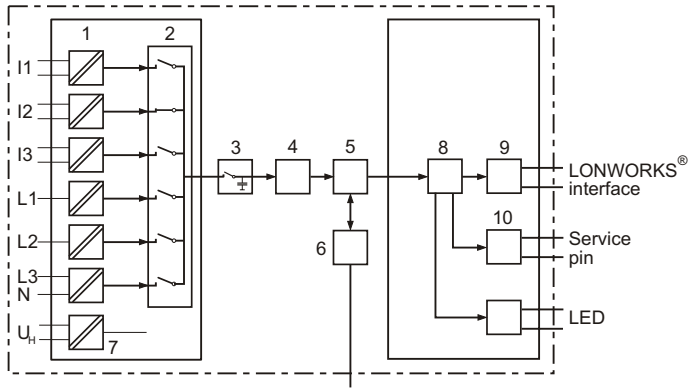
RISH *Ducer* M00 (Fig. 1) is a programmable transducer with a LONWORKS® Interface that simultaneously measures several variables of a heavy-current power system.
The device conforms to the LONMARK® interoperability guidelines, Version 3.0. The measured variables are transferred by means of standard network variable types (SNVT) and are available at the LON interface.
The device is programmed using the LONTALK® file transfer protocol. The transducers are also equipped with an **RS 232** serial interface to which a PC with the corresponding software can be connected for programming or accessing and executing useful ancillary functions.
The usual methods of connection, the rated values of the input variables and the type of internal energy meter are the main parameters that can be programmed.
The ancillary functions include a power system check, a facility for printing rating labels and provision for reading and setting the energy meter.
The transducer fulfils all the essential requirements and regulations concerning electromagnetic compatibility **(EMC)** and **safety** (IEC 1010 resp. EN 61 010). It was developed and is manufactured and tested in strict accordance with the **quality assurance standard** ISO 9001.

Features / Benefits

- Transfer of data via a LON interface with an FTT-10A transceiver and LONTALK® protocol
- Simultaneous measurement of several variables of a heavy-current power system / full supervision of an asymmetrically loaded four-wire power system, rated current 1 to 6 A, rated voltage 57 to 400 (phase to neutral) or 100 to 693 V (phase-to-phase)

Measured variables	Output	Types
Current, voltage (rms), active/reactive/apparent power cosφ, sinφ, power factor RMS value of the current with wire setting range (bimetal measuring function) Slave pointer function for the measurement of the RMS value IB Frequency Average value of the currents with sign of the active power (power system only)	2 analogue outputs and 4 digital outputs or 4 analogue outputs & 2 digital outputs see Data Sheet M 24/42-1 4 analogue outputs & bus interface RS 485 (MODBUS) see Data Sheet M 40-1	M 24 M 42 M 40
	Without analogue outputs, with bus interface RS 485 (MODBUS) see Data Sheet M 01-1 PROFIBUS DP see	M 01

- For all heavy-current power systems variables
- Input voltage up to 693 V (phase-to-phase)
- High accuracy: U/I/P 0.2% (under reference conditions)
- Up to 4 integrated energy meter, storage every each 203 s, storage for: 20 years
- Windows software with password protection for programming, data analysis, power system status simulation, acquisition of meter data and making settings
- AC/DC power supply / universal
- Provision for either snapping the transducer onto top-hat rails or securing it with screws to a wall or panel



1 = Input transformer
2 = Multiplexer
3 = Latching stage
4 = A/D and D/A converter
5 = Microprocessor
6 = Programming interface RS-232 (electrically insulated)
7 = Power supply
8 = NEURON® Chip
9 = FTT-10
10 = Service pin

Fig. 2. Block diagram.

Symbols

Symbols	Meaning
X	Measured variable
X0	Lower limit of the measured variable
X1	Break point of the measured variable
X2	Upper limit of the measured variable
U	Input voltage
Ur	Rated value of the input voltage
U 12	Phase-to-phase voltage L1 – L2
U 23	Phase-to-phase voltage L2 – L3
U 31	Phase-to-phase voltage L3 – L1
U1N	Phase-to-neutral voltage L1 – N
U2N	Phase-to-neutral voltage L2 – N
U3N	Phase-to-neutral voltage L3 – N
UM	Average value of the voltages (U1N + U2N + U3N) / 3
I	Input current
I1	AC current L1
I2	AC current L2
I3	AC current L3
Ir	Rated value of the input current
IM	Average value of the currents (I1 + I2 + I3) / 3

Symbols	Meaning
IMS	Average value of the currents and sign of the active power (P)
IB	RMS value of the current with wire setting range (bimetal measuring function)
BS	Slave pointer function for the measurement of the RMS value IB
φ	Phase-shift between current and voltage
F	Frequency of the input variable
P	Active power of the system P = P1 + P2 + P3
P1	Active power phase 1 (phase-to-neutral L1 – N)
P2	Active power phase 2 (phase-to-neutral L2 – N)
P3	Active power phase 3 (phase-to-neutral L3 – N)
Q	Reactive power of the system Q = Q1 + Q2 + Q3
Q1	Reactive power phase 1 (phase-to-neutral L1 – N)
Q2	Reactive power phase 2 (phase-to-neutral L2 – N)
Q3	Reactive power phase 3 (phase-to-neutral L3 – N)
S	Apparent power of the system $S = \sqrt{I_1^2 + I_2^2 + I_3^2} \cdot \sqrt{U_1^2 + U_2^2 + U_3^2}$
S1	Apparent power phase 1 (phase-to-neutral L1 – N)
S2	Apparent power phase 2 (phase-to-neutral L2 – N)
S3	Apparent power phase 3 (phase-to-neutral L3 – N)
Sr	Rated value of the apparent power of the system
PF	Active power factor $\cos\varphi = P/S$
PF1	Active power factor phase 1 P1/S1
PF2	Active power factor phase 2 P2/S2
PF3	Active power factor phase 3 P3/S3
QF	Reactive power factor $\sin\varphi = Q/S$
QF1	Reactive power factor phase 1 Q1/S1
QF2	Reactive power factor phase 2 Q2/S2
QF3	Reactive power factor phase 3 Q3/S3
LF	Power factor of the system LF = sgnQ · (1 – |PF|)
LF1	Power factor phase 1 sgnQ1 · (1 – |PF 1|)
LF2	Power factor phase 2 sgnQ2 · (1 – |PF 2|)
LF3	Power factor phase 3 sgnQ3 · (1 – |PF 3|)
H	Power supply
Hn	Rated value of the power supply

Technical data

Inputs

Input variables	see Tables 3 and 4
Measuring ranges	see Tables 3 and 4
Waveform	Sinusoidal
Rated frequency	50…60 Hz; 16 2/3 Hz
Consumption	Voltage circuit: ≤ U^2 / 400 kΩ Condition: Characteristic XH01 … XH10 Current circuit: ≤ 0.3 VA · I/5 A

Continuous thermal ratings of inputs

Current circuit	10 A 400 V single-phase AC system 693 V three-phase system
Voltage circuit	480 V single-phase AC system 831 V three-phase system

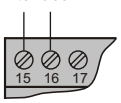
Short-time thermal rating of inputs

Input variable	Number of inputs	Duration of overload	Interval between two overloads
Current circuit	400 V single-phase AC system 693 V three-phase system		
100 A	5	3 s	5 min.
250 A	1	1 s	1 hour
Voltage circuit	1 A, 2 A, 5 A		
Single-phase AC system 600 V H_{intern}: 1.5 Ur	10	10 s	10 s
Three-phase system 1040 V H_{intern}: 1.5 Ur	10	10 s	10 s

LONWORKS® Interface

Standard program ID	80 00 36 15 03 04 04 01
Network protocol	LONTALK®
Transmission medium	Echelon FTT-10A transceiver, transformer coupled, reverse polarity protected, twisted 2-wire cable
Transmission speed	78 kBit/s
Node within a subnet	127
Subnet	255
Number of nodes per network	Max. 32,385
Bus termination	External
Terminals	Screw terminals, terminals 15 and 16

LONWORKS® Interface



System response

Accuracy class	0.2 resp. 0.4 at applications with phase-shift
Energy meter	1.0 acc. to IEC 1036 (0.1 Ir ≤ I ≤ 1.5 Ir)
Duration of the measurement cycle	Depending on measured variable and programming
Response time	1 … 2 times the measurement cycle

Reference conditions

Ambient temperature	15 … 30 °C
Input variable	Rated useful range
Power supply	H = Hn ± 1%
Active/reactive factor	cosφ = 1 resp. sinφ = 1
Frequency	50 … 60 Hz, 16 2/3 Hz
Waveform	Sinusoidal, form factor 1.1107
Miscellaneous	EN 60 688

Influencing quantities and permissible variations
Acc. to EN 60 688

Power supply

AC voltage	100, 110, 230, 400, 500 or 693 V, ± 10%, 45 to 65 Hz Power consumption approx. 10 VA

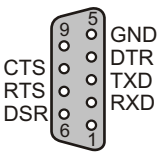
AC/DC power pack (DC and 50 … 60 Hz)
Table 2: Rated voltages and tolerances

Rated voltage U_N	Tolerance
24 … 60 V DC/AC	DC – 15 … + 33% AC ± 10%
85 … 230 V DC/AC	

Consumption	≤ 9 W resp. ≤ 10 VA

Programming connector on transducer

Interface	RS 232 C
DSUB socket	9-pin



The interface is electrically insulated from all other circuits.

Ambient conditions

Variations due to ambient temperature	± 0.2% / 10 K
Nominal range of use for temperature	0…15…30…45°C (usage group II)
Operating temperature	– 10 to + 55 °C
Storage temperature	– 40 to + 85 °C
Annual mean relative humidity	≤ 75%
Altitude	2000 m max.
Indoor use statement	

Applicable standards and regulations

EN 60 688	Electrical measuring transducers for converting AC electrical variables into analogue and digital signals
IEC 1010 or EN 61 010	Safety regulations for electrical measuring, control and laboratory equipment
EN 60529	Protection types by case (code IP)
IEC 255-4 Part E5	High-frequency interference test (solidstate relays only)
IEC1000-4-2,3,4,6	Electromagnetic compatibility for industrial process measurement and control equipment
VDI/VDE 3540, page 2	Reliability of measuring and control equipment (classification of climates)
DIN 40 110	AC quantities
DIN 43 807	Terminal markings
IEC 68 /2-6	Basic environmental testing procedures, vibration, sinusoidal
EN 55011	Electromagnetic compatibility of data processing and telecommunication equipment Limits and measuring principles for radio interference and information equipment
IEC 1036	Solid state AC watt hour meters for active power (Classes 1 and 2)
DIN 43864	Current interface for the transmission of impulses between impulse encoder counter and tarif meter
UL 94	Tests for flammability of plastic materials for parts in devices and appliances
LONMARK®	Interoperability guidelines, Version 3.0

Safety

Protection class	II
Enclosure protection	IP 40, housing IP 20, terminals
Installation category	III
Insulation test	Input voltage: AC 400 V Input current: AC 400 V Output: DC 40 V Power supply: AC 400 V DC 230 V
Surge test	5 kV; 1,2/50 µs; 0,5 Ws
Test voltages	50 Hz, 1 min. according to DIN EN 61 010-1 5550 V, inputs versus all other circuits as well as outer surface 3250 V, input circuits versus each other 3700 V, power supply versus outputs and SCI as well as outer surface 490 V, outputs and SCI versus each other and versus outer surface

Vibration withstand

(tested according to DIN EN 60 068-2-6)

Acceleration	± 2 g
Frequency range	10 … 150 … 10 Hz, rate of frequency sweep: 1 octave/minute
Number of cycles	10 in each of the three axes
Result	No faults occurred, no loss of accuracy and no problems with the snap fastener

Installation data

Housing	Housing **T24** See Section “Dimensioned drawings”
Housing material	Lexan 940 (polycarbonate), flammability class V-0 acc. to UL 94, self-extinguishing, non-dripping, free of halogen
Mounting	For snapping onto top-hat rail (35 × 15 mm or 35 × 7.5 mm) acc. to EN 50 022 or directly onto a wall or panel using the pull-out screw hole brackets
Orientation	Any
Weight	With supply transformer approx. 1.1 kg With AC/DC power pack approx. 0.7 kg

Terminals

Type	Screw terminals with wire guards
Max. wire gauge	≤ 4.0 mm^2 single wire or 2 × 2.5 mm^2 fine wire

Table 1: Standard network variable types (according to application)

Symbols	Meaning	Application (see Table 4)		
		A11 … A16	A34	A24 / A44
U	Input voltage	●	—	—
U12	Phase-to-phase voltage L1 – L2	—	●	●
U23	Phase-to-phase voltage L2 – L3	—	●	●
U31	Phase-to-phase voltage L3 – L1		●	●
U1N	Phase-to-neutral voltage L1 – N	—	—	●
U2N	Phase-to-neutral voltage L2 – N	—	—	●
U3N	Phase-to-neutral voltage L3 – N	—	—	●
UM	Average value of the voltages	—	—	●
I	Input current	●	—	—
I1	AC current L1	—	●	●
I2	AC current L2	—	●	●
I3	AC current L3	—	●	●
IM	Average value of the currents	—	●	●
IMS	Average value of the currents and sign of the active power	—	●	●
IB	RMS value of the current with wire setting range (bimetal measuring function)	●	—	—
IB1	RMS value of the current with wire setting range (bimetal measuring function), phase 1	—	●	●
IB2	RMS value of the current with wire setting range (bimetal measuring function), phase 2	—	●	●
IB3	RMS value of the current with wire setting range (bimetal measuring function), phase 3	—	●	●
BS	Slave pointer function for the measurement of the RMS value IB	●	—	—
BS1	Slave pointer function for the measurement of the RMS value IB, phase 1	—	●	●
BS2	Slave pointer function for the measurement of the RMS value IB, phase 2	—	●	●
BS3	Slave pointer function for the measurement of the RMS value IB, phase 3	—	●	●
F	Frequency of the input variable	●	●	●
P	Active power of the system	●	●	●
P1	Active power phase 1 (phase-to-neutral L1 – N)	—	—	●

Continuation of Table 1:

Symbols	Meaning	Application (see Table 4)		
		A11 … A16	A34	A24 / A44
P2	Active power phase 2 (phase-to-neutral L2 – N)	—	—	●
P3	Active power phase 3 (phase-to-neutral L3 – N)	—	—	●
PF	Active power factor cos φ = P/S	●	●	●
PF1	Active power factor phase 1, P1/S1	—	—	●
PF2	Active power factor phase 2, P2/S2	—	—	●
PF3	Active power factor phase 3, P3/S3	—	—	●
Q	Reactive power of the system	●	●	●
Q1	Reactive power phase 1 (phase-to-neutral L1 – N)	—	—	●
Q2	Reactive power phase 2 (phase-to-neutral L2 – N)	—	—	●
Q3	Reactive power phase 3 (phase-to-neutral L3 – N)	—	—	●
S	Apparent power of the system	●	●	●
S1	Apparent power phase 1 (phase-to-neutral L1 – N)	—	—	●
S2	Apparent power phase 2 (phase-to-neutral L2 – N)	—	—	●
S3	Apparent power phase 3 (phase-to-neutral L3 – N)	—	—	●
LF	Power factor of the system	●	●	●
LF1	Power factor phase 1	—	—	●
LF2	Power factor phase 2	—	—	●
LF3	Power factor phase 3	—	—	●
QF	Reactive power factor sinφ = Q/S	●	●	●
QF1	Reactive power factor phase 1, Q1/S1	—	—	●
QF2	Reactive power factor phase 2, Q2/S2	—	—	●
QF3	Reactive power factor phase 3, Q3/S3	—	—	●
EA	Energy meter 1	●	●	●
EB	Energy meter 2	●	●	●
EC	Energy meter 3	●	●	●
ED	Energy meter 4	●	●	●

Where c.t's and/or v.t's are used for measurement, the values are referred to the primaries of the transformers.

Variables

– Energy meter reset
– Maximum value pointer reset

Basic programming

A version of the M00 transducer with a basic program is also available which is recommended if the programming data are unknown at the time of ordering (see “Table 3: Ordering information», Feature 6).

Basic programming		Marking
Appllication:	4-wire, 3-phase system, asymmetric load (NPS)	A 44
Input voltage:	Design value Ur = 100 V	U 21
Input current:	Design value Ir = 2 A without specification of primary rating	V 2 W 0
Energy meter 1:	P System (incoming)	EA 58
Energy meter 2:	Q System (inductive)	FA 62
Energy meter 3:	P1 L1 (incoming)	GA 59
Energy meter 4:	I1 L1	HA 51

Table 4: Programming

DESCRIPTION	Application A11 … A16	A34	A24 / A44
1. Application (system)			
Single-phase AC	A11	——	——
3-wire, 3-phase symmetric load, phase-shift U: L1-L2, I: L1*	A12	——	——
3-wire, 3-phase symmetric load	A13	——	——
4-wire, 3-phase symmetric load	A14	——	——
3-wire, 3-phase symmetric load, phase-shift U: L3-L1, I: L1*	A15	——	——
3-wire, 3-phase symmetric load, phase-shift U: L2-L3, I: L1*	A16	——	——
3-wire, 3-phase asymmetric load	——	A34	——
4-wire, 3-phase asymmetric load	——	——	A44
4-wire, 3-phase asymmetric load, open Y	——	——	A24
2. Input voltage			
Rated value Ur = 57.7 V	U01	——	——
Rated value Ur = 63.5 V	U02	——	——
Rated value Ur = 100 V	U03	——	——
Rated value Ur = 110 V	U04	——	——
Rated value Ur = 120 V	U05	——	——
Rated value Ur = 230 V	U06	——	——
Rated value Ur [V]	U91	——	——
Rated value Ur = 100 V	U21	U21	U21
Rated value Ur = 110 V	U22	U22	U22
Rated value Ur = 115 V	U23	U23	U23
Rated value Ur = 120 V	U24	U24	U24
Rated value Ur = 400 V	U25	U25	U25
Rated value Ur = 500 V	U26	U26	U26
Rated value Ur [V]	U93	U93	U93
Lines U01 to U06 and U91: Only for single phase AC current or 4-wire, 3-phase symmetric load Line U91: Ur [V] 57 to 400 Line U93: Ur [V] > 100 to 693			

* Accuracy class 0.4

Table 4 continued on next page!

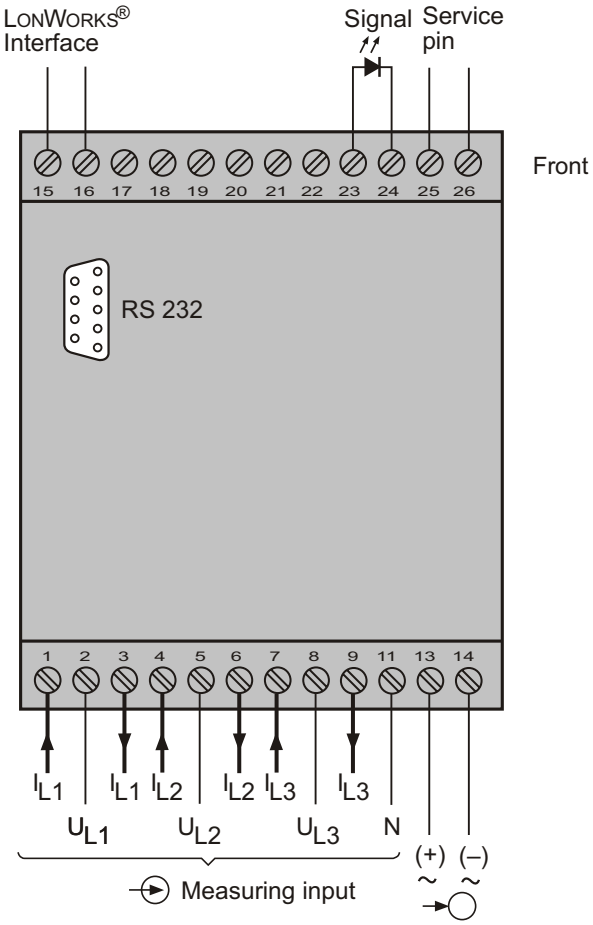
Continuation "Table 4: Programming"

DESCRIPTION	Application A11 … A16	A34	A24 / A44
3. Input current			
Rated value Ir = 1 A V1	V1	V1	
Rated value Ir = 2 A V2	V2	V2	
Rated value Ir = 5 A V3	V3	V3	
Rated value Ir > 1 to 6 [A]	V9	V9	V9
4. Primary rating (primary transformer)			
Without specification of primary rating	W0	W0	W0
CT = A / Ir A VT = kV / Ur V	W9	W9	W9
Line W9: Specify transformer ratio prim. 1000 A; 33 kV			
5. Energy meter 1			
Not used	EA00	EA00	EA00
I System [Wh]	EA50	—	—
I1 L1 [Wh]	—	EA51	EA51
I2 L2 [Wh]	—	EA52	EA52
I3 L3 [Wh]	—	EA53	EA53
S System [Wh]	EA54	EA54	EA54
S1 L1 [Wh]	—	—	EA55
S2 L2 [Wh]	—	—	EA56
S3 L3 [Wh]	—	—	EA57
P System (incoming) [Wh]	EA58	EA58	EA58
P1 L1 (incoming) [Wh]	—	—	EA59
P2 L2 (incoming) [Wh]	—	—	EA60
P3 L3 (incoming) [Wh]	—	—	EA61
Q System (inductive) [Wh]	EA62	EA62	EA62
Q1 L1 (inductive) [Wh]	—	—	EA63
Q2 L2 (inductive) [Wh]	—	—	EA64
Q3 L3 (inductive) [Wh]	—	—	EA65
P System (outgoing) [Wh]	EA66	EA66	EA66
P1 L1 (outgoing) [Wh]	—	—	EA67
P2 L2 (outgoing) [Wh]	—	—	EA68
P3 L3 (outgoing) [Wh]	—	—	EA69
Q System (capacitive) [Wh]	EA70	EA70	EA70
Q1 L1 (capacitive) [Wh]	—	—	EA71
Q2 L2 (capacitive) [Wh]	—	—	EA72
Q3 L3 (capacitive) [Wh]	—	—	EA73
6. Energy meter 2			
Same as energy meter 1, but markings start with a capital F	FA ..	FA ..	FA ..
7. Energy meter 3			
Same as energy meter 1, but markings start with a capital G	GA ..	GA ..	GA ..
8. Energy meter 4			
Same as energy meter 1, but markings start with a capital H	HA ..	HA ..	HA ..

Note: The energy reading is referred to the power P = I · Up for I, respectively I1 · Up for I1, I2 · Up for I2 and I3 · Up for I3 where Up = the primary rated voltage or the secondary rated voltage if there is no v.t..

Electrical connections

Function			Connection
Measuring input	AC current	IL1	1 / 3
		IL2	4 / 6
		IL3	7 / 9
	AC voltage	UL1	2
		UL2	5
		UL3	8
		N	11
LonWorks® Interface			15 16
Signal			23 24
Service pin			25 26
Power supply	AC	~	13
		~	14
	DC	+	13
		–	14

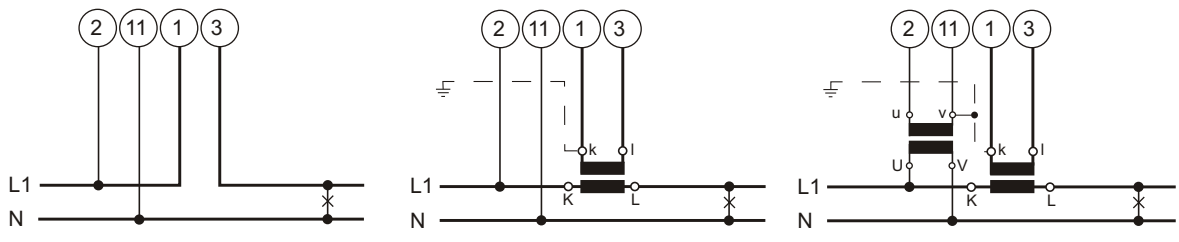


If power supply is taken from the measured voltage internal connections are as follow:

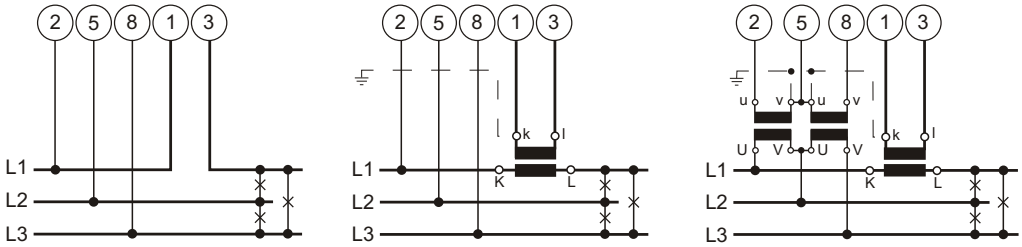
Application (system)	Internal connection Terminal / System
Single-phase AC current	2 / 11 (L1 – N)
4-wire 3-phase symmetric load	2 / 11 (L1 – N)
All other (apart from A15 / A16 / A24)	2 / 5 (L1 – L2)

Find and Signal (terminals 23 and 24)
By polling the LonWorks® network, it is possible to determine the neuron ID's of the various devices connected. A signal prompts the particular device to identify itself. A LED (e.g. HLMP, Order No. 970 881) connected to terminals 23 and 24 flashes briefly.

Service-Pin (terminals 25 and 26)
A device is made to send its Neuron ID by short-circuiting terminals 25 and 26.

Measuring input	
System / application	Terminals
Single-phase AC system	

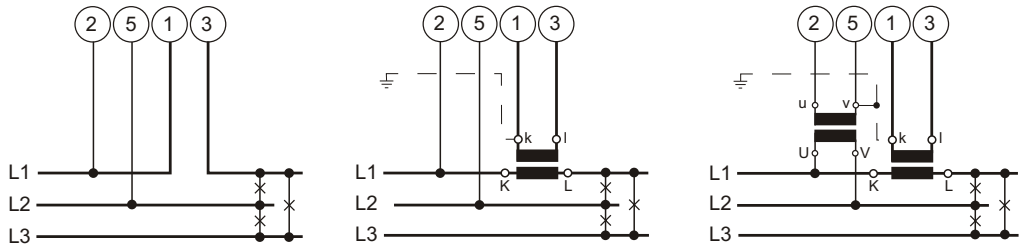
Measuring inputs

System / application	Terminals
3-wire 3-phase **symmetric load** I: L1	

Connect the voltage according to the following table for current measurement in L2 or L3:

Current transf.	Terminals		2	5	8
L2	1	3	L2	L3	L1
L3	1	3	L3	L1	L2

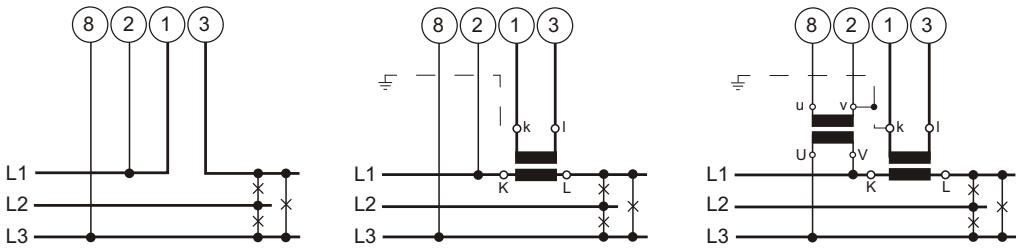
3-wire 3-phase **symmetric load** phase-shift U: L1 – L2 I: L1



Connect the voltage according to the following table for current measurement in L2 or L3:

Current transf.	Terminals		2	5
L2	1	3	L2	L3
L3	1	3	L3	L1

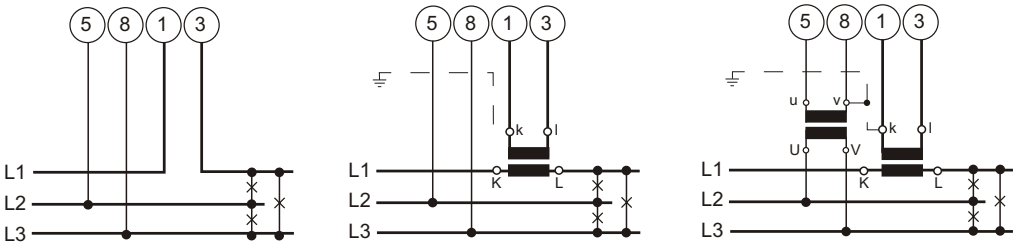
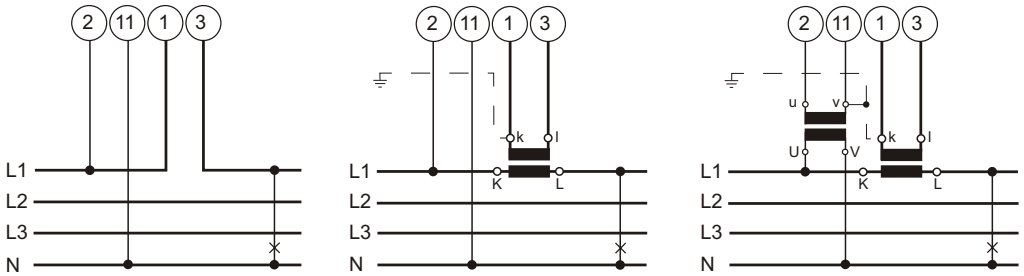
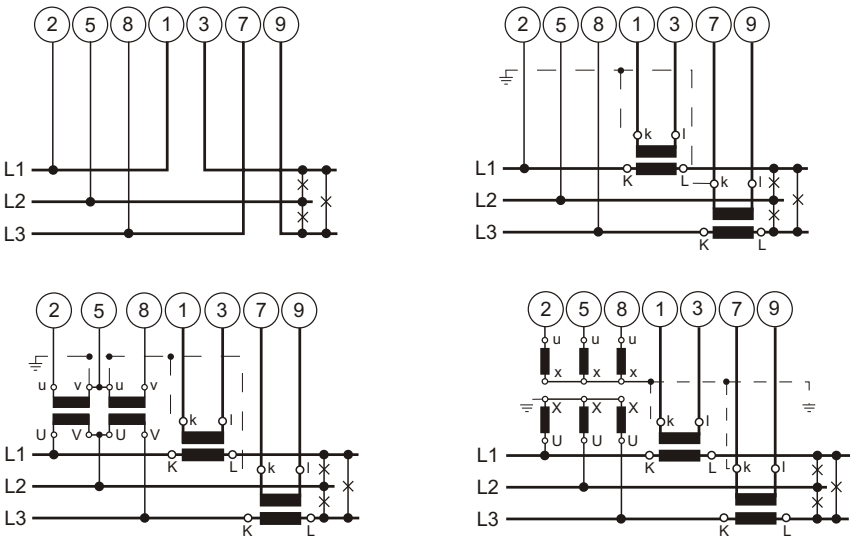
3-wire 3-phase **symmetric load** phase-shift U: L3 – L1 I: L1



Connect the voltage according to the following table for current measurement in L2 or L3:

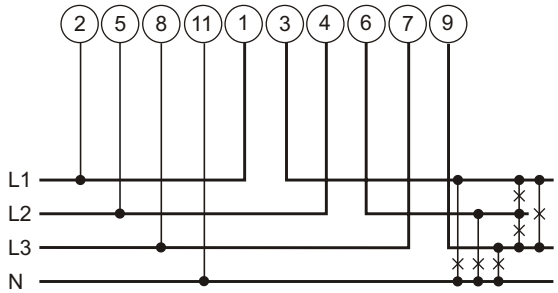
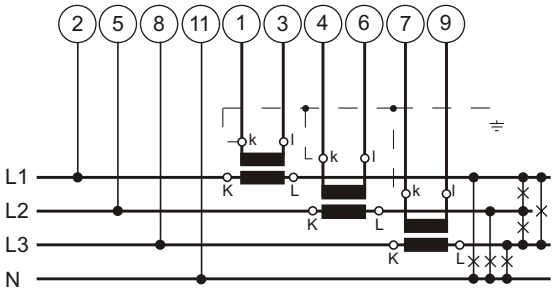
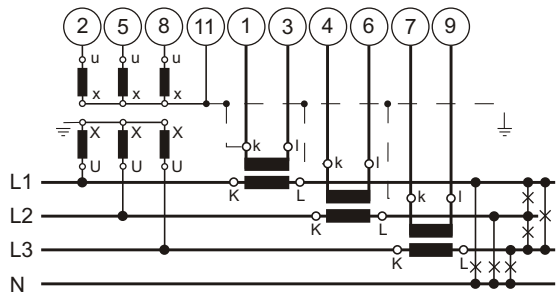
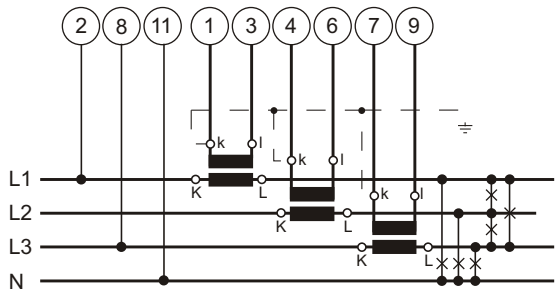
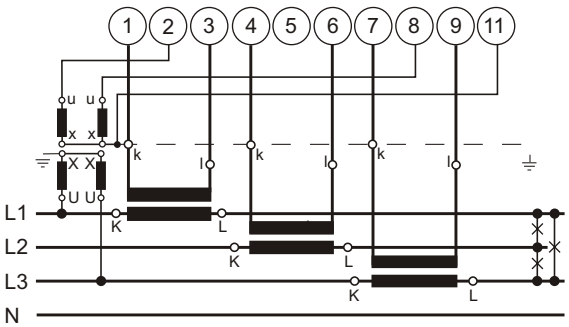
Current transf.	Terminals		8	2
L2	1	3	L1	L2
L3	1	3	L2	L3

Measuring inputs

System / application	Terminals
3-wire 3-phase **symmetric load** phase-shift U: L2 – L3 I: L1	 Connect the voltage according to the following table for current measurement in L2 or L3:
4-wire 3-phase **symmetric load** I: L1	 Connect the voltage according to the following table for current measurement in L2 or L3:
3-wire 3-phase **asymmetric load**	

Current transf.	Terminals		5	8
L2	1	3	L3	L1
L3	1	3	L1	L2

Current transf.	Terminals		2	11
L2	1	3	L2	N
L3	1	3	L3	N

Measuring inputs	
System / application	Terminals
4-wire 3-phase **asymmetric load**	   3 single-pole insulated voltage transformers in high-voltage system
4-wire 3-phase **asymmetric load,** Open Y connection	 Low-voltage system  2 single-pole insulated voltage transformers in high-voltage system

Relationship between PF, QF and LF

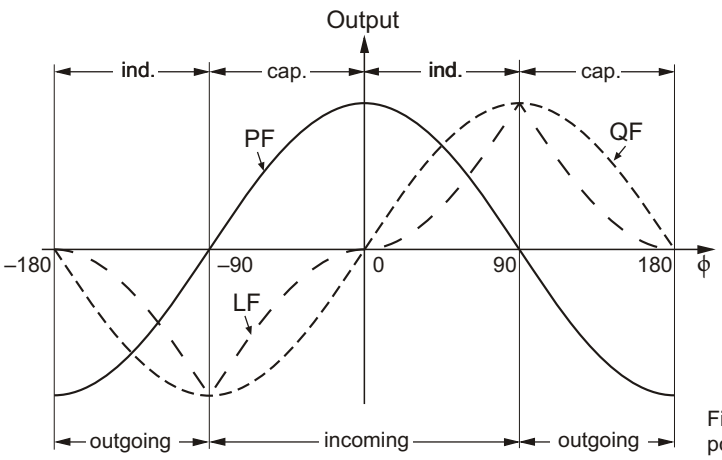


Fig. 3. Active power PF ——, reactive power QF ------, power factor LF – – – –.

Dimensioned drawings

All Dimensions are in mm

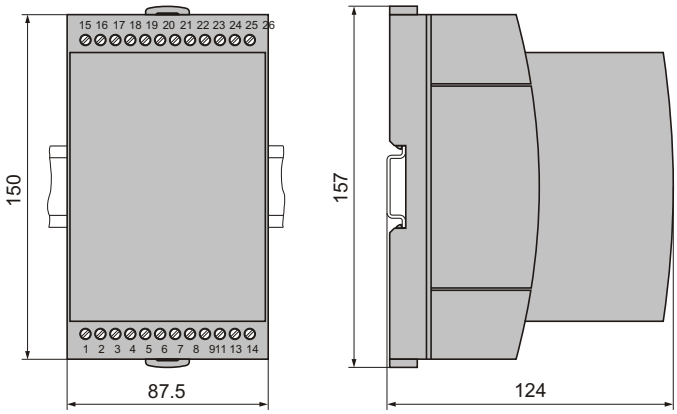


Fig. 4. RISH *Ducer* M 00 in housing T24 clipped onto a top-hat rail (35 · 15 mm or 35 · 7.5 mm, acc. to EN 50 022).

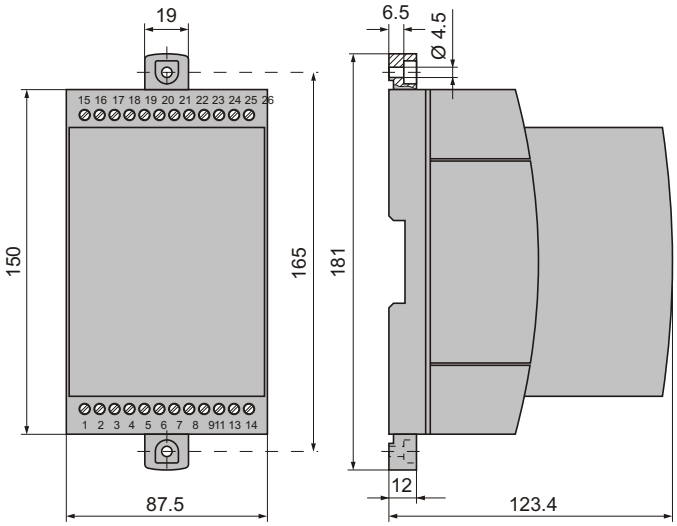


Fig. 5. RISH *Ducer* M 00 in housing T24, screw hole mounting brackets pulled out.

Table 5: Accessories

Description
Programming cable
Configuration software for RISH *Ducer* M 24, 40, 42, RISH *Ducer* M 00, 01 Windows 3.1x, 95, 98, NT and 2000 on CD in English
Operating Instructions M 00-1

Table 3: Ordering information

DESCRIPTION	MARKING
1. Mechanical design Housing T24 for rail and wall mounting	M00 - 1
2. Rated frequency	
1) 50 Hz (60 Hz possible without additional error; 16 2/3 Hz, additional error 1.25 · c)	1
2) 60 Hz (50 Hz possible without additional error; 16 2/3 Hz, additional error 1.25 · c)	2
3) 16 2/3 Hz (not re-programming by user, 50/60 Hz possible, but with additional error 1.25 · c)	3
3. Power supply Nominal range	
1) AC 90 … 110 V H_n = 100 V	1
2) AC 99 … 121 V H_n = 110 V	2
3) AC 207 … 253 V H_n = 230 V	3
4) AC 360 … 440 V H_n = 400 V	4
5) AC 450 … 550 V H_n = 500 V	5
6) AC 623 … 762 V H_n = 693 V	6
7) DC/AC 24 … 60 V	7
8) DC/AC 85 … 230 V	8

Table 3 continued on next page!

Continuation “Table 3: Ordering information”

DESCRIPTION	MARKING
4. Power supply connection	
1) External (standard)	1
2) Internal from voltage input (not allowed for CSA)	2
Line 2: Not available for rated frequency 16 2/3 Hz and applications A15 / A16 / A24 Caution: The power supply voltage must agree with the input voltage (Table 4)!	
5. Test certificate	
0) None supplied	0
1) Supplied	1
6. Programming	
0) Basic	0
9) According to specification	9
Line 0: Not available if the power supply is taken from the voltage input Line 9: All the programming data must be entered on Form W 2388 e (see appendix) and the form must be included with the order, if the primary values of the measured variables or meter readings have to be transferred.	

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